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THE ACTIVE IMMUNISATION OF NEWBORN LAMBS AGAINST PULPY KIDNEY DISEASE (*CL. WELCHII* TYPE D ENTEROTOXAEMIA)

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The prevention of infectious disease in the very young lamb has received a great deal of attention in the past. When Mason *et al* (1930) showed that in sheep maternal antibodies were not transmitted to the lamb *in utero* but by means of the colostrum, it was clear that if the ewe was either actively or passively immunised the newborn lamb could acquire immunity by suckling. The ability to absorb, in any appreciable amount, the antibodies in ingested colostrum appears to be confined to about the first 48 hours of life; after which time the antibody titre of colostrum is in any case much lowered, and the passive immunity thus acquired is variable and diminishing. In diseases which occur only during the first weeks of life, for instance in lamb dysentery, adequate protection can be obtained by the lambs from the antibodies absorbed from the colostrum of immunised ewes. A similar short-term protection can be achieved by the injection of the appropriate serum at birth. On the other hand in the case of pulpy kidney disease, which can and does occur at all ages, the problem of prevention is rendered much more complex. As repeated injections of serum are neither practicable nor economical, we sought to discover whether, by using a really efficient antigen, it was possible to begin the active immunisation of the lamb soon after birth.

In the United States Smith & Marsh (1953) have attempted to vaccinate young lambs using the American commercial Type D *Cl. welchii* " bacterin " but the first injection was never given until the lamb was at least 10 days old. They reported that vaccination with their antigen was of little value at this age and that they could not expect all lambs to respond unless they were at least 60 days old at the time of vaccination. This failure to respond at the earlier age did not appear to be due to the presence of maternally derived passive antitoxin at the time of vaccination, but rather to the unactivated bacterin which they used.

Following the work of Vahlquist (1949) and Barr *et al.* (1950 and 1952) it is now generally accepted that failure to immunise actively very young babies and lambs even with a precipitated antigen is due rather to interference by maternally conferred antitoxin than to their physiological inability to respond. Barr *et al.* (1952) showed that lambs injected on the day of birth with diphtheria A.P.T. produced antitoxin within three weeks. Here there was no possibility of interference from antitoxin passively acquired from the ewe.

In the work here described we were concerned to show whether very young lambs from " normal " ewes, *i.e.*, ewes which had not been artificially immunised, would respond to injections of an antigen, *viz.*, activated alum precipitated *Cl. welchii* Type D toxoid (the " Improved " pulpy kidney vaccine of commerce) which had been shown capable of stimulating a high level of circulating antitoxin in older sheep (Thomson & Batty, 1953). We were also interested in the effect which the presence of a passive immunity, either homologous (derived from the colostrum of actively immunised ewes) or heterologous (obtained by the injection of pulpy kidney antiserum of horse origin) would have on the development of active immunity in the lambs.

PROCEDURE

The antigen used throughout the experiment was activated alum precipitated *Cl. welchii* Type D toxoid, for convenience designated T.T.P. in the tables. The dose for both ewes and lambs was 2 ml.

A flock of 294 in-lamb ewes was used for the experiment, and all their lambs were permanently marked at birth with an individual number.

Of these ewes 98 were actively immunised by the injection of the antigen on two occasions, the interval between injections being six weeks. To ensure the highest possible antibody titre in the colostrum at the time of lambing the second injection of antigen was given two weeks before lambing was due to commence.

The lambs born from the 196 non-immunised ewes were divided into two equal groups. One group received a first injection of the antigen before they were three days old (Group I): 25 of these lambs received in addition a prophylactic injection of pulpy kidney antiserum at the same time but at a different site (Group III). The other group of lambs received no treatment.

Twenty-five lambs born from the group of immunised ewes received a first injection of the antigen before they were three days old (Group II). The remaining lambs born from these ewes were not injected.

A second injection of antigen was given to all lambs injected at birth, the interval between the two injections ranging (for practical reasons) from 17 to 38 days.

Blood samples were taken from the lambs as follows:—

(*a*) at the time of the first injection

(*b*) at the time of the second injection

(*c*) 14 to 16 days after the second injection.

The lambs from which the blood samples were taken were:—

Group I.—Twenty-five lambs born from non-immunised ewes and first injected with the antigen within three days of birth.

Group II.—Twenty-five lambs born from immunised ewes and similarly first injected with the antigen within three days of birth.

Group III.—Twenty-five lambs born from non-immunised ewes and injected with both the antigen and a prophylactic injection (2 ml.) of pulpy kidney antiserum within three days of birth.

Group IV.—In addition to those above, single blood samples were taken from 40 lambs born from immunised ewes but not injected with the antigen, at ages ranging from two to six weeks.

The serum from each sample was titrated for ε antitoxin content by the rabbit intracutaneous test (Batty & Glenny, 1947). Titrations were made at approximately twofold differences and a recorded value of 0·2 for example means that the serum was over 0·2 but under 0·5 unit per ml. In calculating the geometric means of the groups the value of the serum was taken as the geometric mean of the two values between which it lay.

Results and Discussion

Group I. Lambs from " normal " ewes

An examination of the pre-injection titres of these lambs shows that a proportion of the " normal " ewes must have had naturally acquired immunity. The amount of passive immunity acquired by their lambs was, however, very variable, and approximately 44 per cent. of the group had antitoxin titres which could not be expected to afford protection for any great length of time. Of these 36 per cent. (those with less than 0·10 unit per ml.) could hardly be considered to have acquired sufficient passive antitoxin to be protected at any time.

At the time of the second injection the scatter of values was very much reduced; those lambs that had acquired large amounts of passive antitoxin had lost a considerable proportion of it, while those that had had very little passive antitoxin were already producing antitoxin. The titre obtained 14 to 16 days after the second injection shows that, with one possible exception, all the lambs had given a secondary response to the second injection. It therefore follows that the first injection was an efficient primary stimulus in all these lambs, despite the variation in the amount of passive immunity present at this time. More than half these lambs had titres greater than 1 unit per ml. while none had less than 0·2 units of circulating ε antitoxin per ml. and all would be considered satisfactorily immunised. The possible exception was the lamb that had 5 units per ml. of passive antitoxin at the time of the first injection and when re-injected at three weeks had a titre of 0·5 unit per ml. The same titre was found 14 days later.

As all the lambs in these experiments were distinguishable, individual responses were considered and there was a strong suggestion, particularly where the interval between injections was 28 to 35 days, that the best and most consistent results were obtained if the level of circulating passively acquired antitoxin did not exceed 0·5 unit per ml. at the time of the first injection.

Table I

Antitoxin Titres of Lambs from " Normal " Ewes Injected within Three Days of Birth with the First of Two Doses of T.T.P.* Grouped according to the Spacing of the Injections (Group I)

Number of lambs having ε antitoxin titres (units per ml.)

	<0·01	0·01–0·02	0·02–0·05	0·05–0·1	0·1–0·2	0·2–0·5	0·5–1·0	1–2	2–5	5–10	10–20
At the time of the first injection re-injected after :—											
2–3 weeks	–	–	1	–	–	2	–	–	–	2	–
3–4 "	2	1	–	1	2	2	1	–	–	–	–
4–5 "	–	1	1	1	–	1	1	–	2	–	1
5–6 "	1	–	–	–	–	–	1	–	–	1	–
All lambs	3	2	2	2	–	5	3	–	2	3	1
At the time of the second injection after :—											
2–3 weeks	–	–	–	2	–	1	2	–	–	–	–
3–4 "	–	–	3	3	1	2	–	–	–	–	–
4–5 "	–	–	–	2	3	–	1	2	–	–	–
5–6 "	–	–	–	–	2	–	1	–	–	–	–
All lambs	–	–	3	7	6	3	4	2	–	–	–
14–16 days after the second injection :—											
at 2–3 weeks	–	–	–	–	–	–	3	1	1	–	–
3–4 "	–	–	–	–	–	2	1	1	4	1	–
4–5 "	–	–	–	–	–	1	–	1	2	4	–
5–6 "	–	–	–	–	–	–	–	1	–	1	1
All lambs	–	–	–	–	–	3	4	4	7	6	1

* Activated alum precipitated *Cl. welchii* Type D toxoid.

Group II. Lambs from immunised ewes

The results for lambs born from artificially immunised ewes are recorded in Table II and show the consistently high level of passive immunity acquired by these lambs; no lamb had less than 0·2 unit per ml. while 60 per cent. had more than 1 unit per ml. of circulating antitoxin.

As was expected the degree of response to the first injection was difficult to assess and it was clear that this high level of passive antitoxin was seriously interfering with and delaying the response to the first injection. In all but one of these lambs the presence of these diminishing though considerable amounts masked any active production which had taken place between the first and second injection.

TABLE II

ANTITOXIN TITRES OF LAMBS FROM IMMUNISED EWES INJECTED WITHIN THREE DAYS OF BIRTH WITH THE FIRST OF TWO DOSES OF T.T.P., GROUPED ACCORDING TO THE SPACING OF THE INJECTIONS (GROUP II)

Number of lambs having ε antitoxin titres (units per ml.)

	<0·01	0·01–0·02	0·02–0·05	0·05–0·1	0·1–0·2	0·2–0·5	0·5–1·0	1–2	2–5	5–10	10–20
At the time of the first injection re-injected after :—											
2–3 weeks	–	–	–	–	–	–	3	–	3	–	–
3–4 „	–	–	–	–	–	–	2	–	4	2	–
4–5 „	–	–	–	–	–	2	1	1	–	2	1
5–6 „	–	–	–	–	–	–	1	–	1	–	2
All lambs	–	–	–	–	–	2	7	1	8	4	3
At the time of the second injection after :—											
2–3 weeks	–	–	–	–	1	4	1	–	–	–	–
3–4 „	–	–	–	1	–	3	3	1	–	–	–
4–5 „	–	–	–	1	2	1	2	1	–	–	–
5–6 „	–	–	–	–	1	1	–	–	1	1	–
All lambs	–	–	–	2	4	9	6	2	1	1	–
14–16 days after the second injection after :—											
2–3 weeks	–	–	–	–	–	2	2	2	–	–	–
3–4 „	–	–	–	–	–	2	–	3	3	1	–
4–5 „	–	–	–	–	–	–	–	2	4	–	–
5–6 „	–	–	–	–	–	–	–	2	2	–	–
All lambs	–	–	–	–	–	4	2	9	9	1	–

The lambs that showed active production had had the smallest amount of passive antitoxin.

The response to the second injection was clearer and more satisfactory; over 60 per cent. of the lambs showed a secondary response while the remainder probably gave an intermediate type of response and had not reached the peak of production at the time this sample was taken. Seventy-five per cent. of the lambs had more than 1 unit of ε antitoxin per ml., while no lamb had less than 0·2 unit per ml., and we should consider that they had all been satisfactorily immunised.

Group III. Lambs, from "normal" ewes, injected at birth with 2 ml. of antigen and 2 ml. of pulpy kidney antiserum (heterologous)

TABLE III

ANTITOXIN TITRES OF LAMBS FROM "NORMAL" EWES INJECTED WITHIN THREE DAYS OF BIRTH WITH 2 ML. T.T.P. AND 2 ML. PULPY KIDNEY ANTISERUM, RE-INJECTED WITH 2 ML. T.T.P. AND GROUPED ACCORDING TO THE SPACING OF THE INJECTIONS (GROUP III)

Number of lambs having ε antitoxin titres units per ml.

	<0·01	0·01–0·02	0·02–0·05	0·05–0·1	0·1–0·2	0·2–0·5	0·5–1·0	1–2	2–5	5–10	10–20
At the time of the first injection re-injected after :—											
2–3 weeks	–	–	–	1	1	2	1	–	1	–	1
3–4 „	1	1	1	–	1	4	–	–	1	–	–
4–5 „	–	–	1	–	–	3	–	–	1	–	–
5–6 „	–	1	–	–	–	1	2	–	–	–	–
All lambs	1	2	2	1	2	10	3	–	3	–	1
At the time of the second injection after :—											
2–3 weeks	–	–	–	–	1	3	1	1	1	–	–
3–4 „	–	–	–	–	6	3	–	–	–	–	–
4–5 „	–	–	–	1	2	2	–	–	–	–	–
5–6 „	–	–	–	1	1	2	–	–	–	–	–
All lambs	–	–	–	2	10	10	1	1	1	–	–
14–16 days after the second injection after :—											
2–3 weeks	–	–	–	–	–	1	–	3	3	–	–
3–4 „	–	–	–	–	–	2	–	3	4	–	–
4–5 „	–	–	–	–	–	–	–	2	2	1	–
5–6 „	–	–	–	–	–	1	–	–	2	–	1
All lambs	–	–	–	–	–	4	–	8	11	1	1

In considering the results recorded in Table III it must be remembered that the pre-injection titres recorded were raised by at least 0·75 unit per ml. of passive heterologous antitoxin during the first few days by the injection of the prophylactic dose of pulpy kidney antiserum. As would be expected these pre-injection titres were very similar to those shown in Table I.

The loss of passive antitoxin is exponential (Glenny & Hopkins, 1922), and it is known that heterologous antitoxin is lost more rapidly than homologous antitoxin; 30 per cent. per week in a lamb (figure arrived at from Mason *et al.*, 1930) compared with 16 per cent. per week for homologous antitoxin (Barr *et al.*, 1953). The titres obtained at the time of the second injection must have been a combination of residual passive and increasing actively produced antitoxin.

Fourteen to 16 days after the second injection the titres showed that all these lambs gave a secondary response, and none had less than 0·2 unit per ml. of circulating antitoxin while 84 per cent. had more than 1 unit per ml. Thus in spite of the interference one might expect from the presence of both heterologous and homologous antitoxin at the time of the first injection of antigen, and possibly also at the time of the second injection in those lambs re-injected after the shorter interval, it was clearly possible to establish a satisfactory level of immunity using two injections of this antigen.

In considering the interference due to the presence of passive antitoxin a detailed examination of the response of individual lambs reveals the effect most clearly. These results are given in Table IV and shown graphically in Fig. 1 (below).

TABLE IV

ANTITOXIN TITRES OF LAMBS, FROM NORMAL EWES, INJECTED WITHIN THREE DAYS OF BIRTH WITH T.T.P. AND RE-INJECTED 28 DAYS LATER

Lamb number in Fig. 1	At the time of the first injection	At the time of the second injection	14–16 days later
Group (a) 8 ...	ca0·1	0·05	5·0
7 ...	0·02	0·05	5·0
6 ...	0·05	0·5	5·0
5 ...	0·2	1·0	5·0
Group (b) 4 ...	0·5	0·1	1·0
3 ...	2·0	0·1	0·2
2 ...	2·0	0·1	2·0
1 ...	10·0	1·0	2·0

Barr *et al.* (1953) have shown that interference by passive antitoxin is quantitative in relation to the amount of antigen injected and occurs when a certain level has been exceeded. Our results are similar to theirs, and following their procedure for calculating the total antitoxin content of the lambs it is found that those whose pre-injection titre was below 0·5 unit per ml. (Group (a) in both Fig 1 and Table IV) had a total antitoxin content not exceeding two and a half times the amount necessary to neutralise the dose of antigen injected. This amount of antitoxin was too small to interfere seriously with the action of this antigen and all these lambs showed active production within four weeks of the first injection, and a good secondary response 14 to 16 days after the second injection.

When, however, the total antitoxin content of the lamb was more than two and a half times the amount necessary to neutralise the injected antigen (Group B in Fig. 1 and

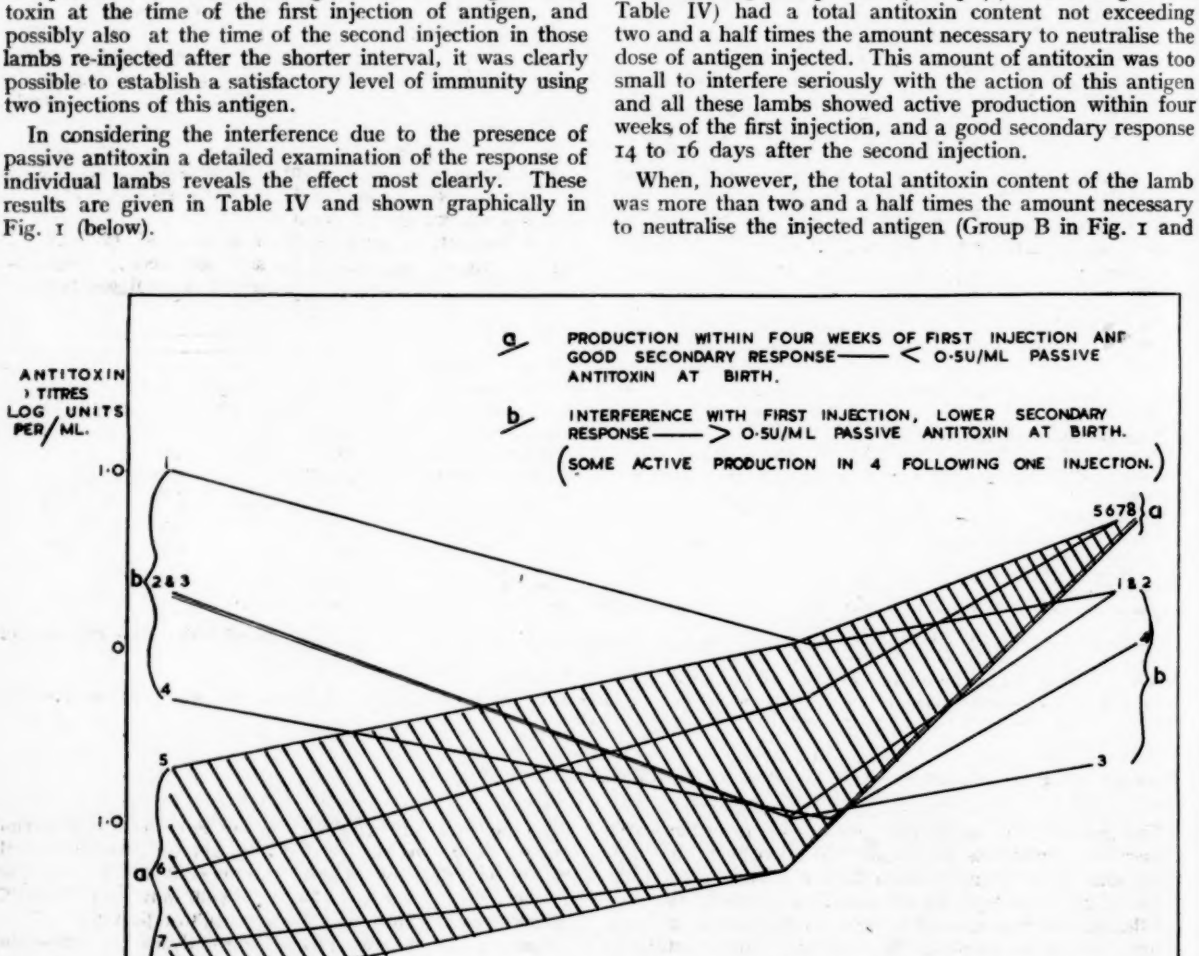

Table IV) the response to the first injection was interfered with seriously and the antitoxin titres at the time of the second injection could be entirely due to the residual passive antitoxin, though from the shape of the curves it is probable that some active production had taken place in lamb 4. Although all the lambs have given a secondary response to the second injection the response is neither so good nor so uniform as that given by the lambs having a pre-injection titre of less than 0·5 unit per ml.

Conclusions

These experiments show that it is possible to begin the active immunisation of newborn lambs against pulpy kidney disease (enterotoxaemia due to *Cl. welchii* Type D) by any of the following methods.

(1) By the injection of two doses of activated alum precipitated *Cl. welchii* Type D toxoid. The first injection may be given as soon after birth as practicable and the second injection not less than four weeks later.

(2) By combined active and homologous passive immunisation; the active immunity obtained by the injection of antigen as in method (1) and the passive immunity being conferred by suckling the colostrum of actively immunised ewes.

(3) By combined active and heterologous passive immunisation; the active immunity obtained as in method (1) and the passive immunity by the injection of heterologous pulpy kidney antiserum.

It is important, particularly with methods (2) and (3), that a sufficient interval, at least four weeks, should be allowed before the second injection of the antigen, because with the particular dose of the antigen used a circulating passive antitoxin titre of 0·5 unit per ml. interferes with the development of active immunity; thus if the interval between the two injections of antigen were unduly short, interference might occur with the response to both.

Since 2 ml. of concentrated lamb dysentery antiserum contains a prophylactic dose of ε (pulpy kidney) antitoxin, the success of the third method means that it is reasonable to commence the active immunisation of lambs against pulpy kidney disease at the same time as the injection

Table V

Antitoxin Titres of Uninjected Lambs from Immunised Ewes Sampled at Various Ages (Group IV)
Number of lambs having antitoxin titres units per ml.

	<0·01	0·01–0·02	0·02–0·05	0·05–0·1	0·1–0·2	0·2–0·5	0·5–1·0
Age of lambs when sampled :—							
2–3 weeks	–	–	–	–	1	5	2
3–4 „	–	–	–	1	–	8	3
4–5 „	–	–	1	3	2	3	–
5–6 „	–	–	1	1	2	2	5

The results recorded in Table V show that the active immunisation of ewes during pregnancy would protect the majority of their lambs for the first five to six weeks of life. It should, however, be remembered that if the active immunisation of the lambs were delayed until this time, these lambs would be at risk until the development of a sufficiently high level of circulating antitoxin at least three to four weeks later. This method of protection is the least certain as even if the ewes had a high level of circulating antitoxin, and the colostrum titre was high, there would always be the lamb which suckled badly or had to share the colostrum with its twin or triplets and only achieved a low level of passive protection.

Table VI

Summary of Geometric Mean Titres

Interval between injection or age in Group IV	Group I (a)	Group I (b)	Group I (c)	Group II (a)	Group II (b)	Group II (c)	Group III (a)	Group III (b)	Group III (c)	Group IV
2–3 weeks	0·69	0·24	1·09	1·5	0·32	0·68	0·61	0·55	1·6	0·35
3–4 „	0·098	0·08	1·6	2·7	0·38	1·6	0·13	0·18	1·45	0·34
4–5 „	0·42	0·26	3·2	1·8	0·32	2·4	0·32	0·17	2·7	0·12
5–6 „	0·33	0·24	5·2	5·6	1·0	2·1	0·21	0·18	2·6	0·28
All lambs	0·27	0·17	2·1	2·4	0·4	1·5	0·26	0·24	1·85	

Group I. Lambs from " normal " ewes injected with alum precipitated activated *Cl. welchii* Type D toxoid within three days of birth and again 17–38 days later.

Group II. Lambs from immunised ewes injected as Group I.

Group III. Lambs from " normal " ewes injected as Group I together with 2 ml. Pulpy Kidney Antiserum at the time of the first injection.
(a) Geometric mean of titres at the time of the first injection.
(b) „ „ „ „ second „
(c) „ „ 14–16 days after „ „

Group IV. A group of lambs from immunised ewes, no injections.

The geometric means of the groups as recorded in Table VI serve to summarise the results that have been obtained. They also serve to emphasise a further point: namely, the importance of the spacing of injections particularly when the lambs can be expected to have a high level of circulating antitoxin acquired by suckling their artificially immunised or naturally immune dams. No group of lambs responded so well when the interval between injections was less than four weeks as when it was four weeks or longer.

of a prophylactic dose (2 ml.) of lamb dysentery antiserum. This should ensure protection against both lamb dysentery and pulpy kidney disease, *i.e.*, enterotoxaemia due to both *Cl. welchii* Types B and D.

SUMMARY

(1) Lambs from non-immune, naturally immune, and artificially immunised ewes were satisfactorily immunised against pulpy kidney disease (enterotoxaemia due to *Cl. welchii* Type D) by two injections of 2 ml. of activated alum precipitated *Cl. welchii* Type D toxoid (the "Improved" pulpy kidney vaccine of commerce) the first injection being given within three days of birth.

(2) Lambs from non-immune and naturally immune ewes were satisfactorily immunised by this method even when the first injection of antigen was accompanied by the injection of a prophylactic dose of heterologous pulpy kidney antiserum into a different site.

(3) When, in the lamb, a high level of passive antitoxin was present at the time of the first injection the best result was obtained when at least four weeks elapsed before the second injection.

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OTITIS EXTERNA IN THE DOG AND CAT

BY

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Swabs taken from the ears of 27 dogs and 10 cats affected with otitis externa were submitted to bacteriological examination. In all cases in the cats the swabs were taken when otitis persisted after the use of otocaricides.

The bacteriologist's reports showed :—

DOGS		
Staphylococci	...10 cases	— Group A
Staphylococci + *Proteus vulgaris*	... 2 „	— Group A
„ + *Bacterium zopfii*	... 1 „	— Group A
„ + „ *subtilis*	... 1 „	— Group A
Mucor mould	... 1 case	— Group A
Mould (possibly Schizosaccharomyces)	1 „	— Group A
Proteus vulgaris...	... 2 cases	— Group B
Actinomyces	... 1 case	— Group B
Pseudomonas aeruginosa ...	... 2 cases	— Group B
No organisms found	... 6 „	— Group C
CATS		
Staphylococci	... 8 „	
Proteus vulgaris	... 1 case	
Candida albicans	... 1 „	

All the canine cases in Group A were clinically cured after the use of Graneodin ointment (2·5 mg. neomycin hydrochloride and 0·25 mg. gramicidin per gramme) twice daily for 7 to 10 days, and there was no recurrence of symptoms within four weeks of withdrawal of treatment.

In Group B there was no response to treatment with Graneodin ointment, cetrimide, sulphanilamide, ichthyol, Bismuth iodoform paraffin paste, calamine lotion, or colloidal iodine in oil.

In Group C all the cases returned to normal after treatment with calamine lotion, liquid paraffin or antihistamine cream.

The eight cases of Staphylococcal infection in cats were clinically normal after seven days or less of treatment with Graneodin ointment. The two remaining cases did not respond to Graneodin ointment, but recovered in the case of the Proteus vulgaris infection after treatment with zinc oleate and boric acid ointment, and in the case of the fungus infection after dressing with eugenol cream.

Acknowledgment.—The Graneodin ointment, known in the United States of America as Spectrocin ointment, was kindly supplied by Messrs. E. R. Squibb & Sons, the manufacturers, to whom I am also indebted for carrying out the bacteriological examinations.

CLINICAL COMMUNICATION

OSTEOTOMY IN A CASE OF OLD EPIPHYSEAL SEPARATION

N. R. TURNBULL, F.R.C.V.S.

BASINGSTOKE

Subject.—Six-months-old male rough collie.

History.—Had been kicked by a cow on the left hind leg some eight weeks previously. No treatment other than massage had been carried out.

Examination.—First seen on November 17th when the above history was obtained. The left hind leg was held in half flexion. On posterior extension the left leg was about 1½ inches shorter than the right. There was considerable muscle atrophy. On manipulation of the stifle joint the patella could be dislodged, and when this was done the toes of the affected leg could just reach the ground. On flexion, however, the leg was once more carried.

Diagnosis.—A diagnosis of a healed separation of the lower femoral epiphysis with severe backwards rotation of the distal fragment was made.

X-ray.—On November 18th an X-ray was taken (Fig. 1) and this confirmed the diagnosis and showed the patella lying in the defect caused by the displacement.

Proposed Treatment.—It was considered possible to mobilise the epiphysis by osteotomy between points A and B, and C and D (Fig. 1) and repair the fracture thus made by the method of external pinning described by me (*Vet. Rec*. **63**. 678).

Operation.—This was carried out on November 24th. The dog was deeply anaesthetised by intravenous nembutal. An incision was made on the lateral aspect of the stifle from mid-femur to mid-tibia. The stifle joint and the affected epiphysis were exposed. The patella and its muscular and ligamentous attachments were reflected medially and held out of the way with a retractor. Two Kirschner-Ehmer type pins were inserted in the epiphysis and two in the femoral shaft. A gigli wire saw was passed around the "neck" above the condyles (A–B Fig. 1) and the bone sawn through. The distal end of the femoral shaft was then cut in the line C–D (Fig. 1) with an osteotome.

The pins were then connected up in the usual way, the epiphysis rotated into a more normal position and the connecting rods locked (Fig. 2). The patella was allowed to

(*Continued at foot of col. 1, page 255*)

FIG. 1.

FIG. 2.

FIG. 3.

REPORT

[City of Johannesburg—Report of Director, Abattoir and Live Stock Market Department, for the period July 1st, 1952, to June 30th, 1953.]

The duties of the staff of the department embrace a wide range of activities: dairy herd inspection, livestock market inspection, and the care of animals belonging to the City Council, as well as meat inspection.

Despite the large livestock population of the Union of South Africa, numbering in 1950 11·5 million cattle, 3·4 million sheep, 5·2 million goats and ·699 million pigs, large importations of slaughter stock are required to meet the needs of local markets. In 1950 some 152,000 cattle were imported from neighbouring territories. The slaughter of equines at the Johannesburg abattoir commenced in March, 1952, and from then until the end of the year 3,253 horses, 98 mules and 301 donkeys were slaughtered.

Measles in cattle and pigs is a common cause of condemnation, and in 1953 some 3·614 per cent. of cattle and 1·693 per cent. of pigs were found to be infected. During the year under review 37 cattle and 337 pigs were found to be infected with tuberculosis.

The City Council's animals include 1,395 mules, 299 horses, 648 trek oxen, a beef herd, a dairy herd and piggeries. A severe epidemic of horse sickness killed eight horses and 16 mules during the year.

The following preventive inoculations were carried out by the department: 1,098 cattle were vaccinated against Rift Valley fever, 1,897 cattle against anthrax, 224 horses against horse sickness, 186 cows and heifers against contagious abortion, 245 against blackquarter, and 594 poultry against Newcastle disease, fowl typhoid and chicken pox.

Dairy herd inspection during the year entailed visits to 427 dairies and the examination of 28,000 cattle. In the course of this work only one case of clinical tuberculosis was discovered. But in the biological testing of milk samples for tuberculosis 14 samples were found positive out of a total of 1,603 herds examined. It is interesting to record, as bearing out experience in this country, that in two of the herds found to be supplying infected milk the cow responsible in each case gave a negative reaction to the skin test.

The presence of contagious abortion in dairy herds was also investigated and of 1,582 samples of milk examined 59 per cent. were positive to the " Ring " test and 19 per cent. to the agglutination test.

In the examination of milk for mastitis, out of 1,603 herd samples examined 298 were found to be infected.

In concluding his report, Mr. M. C. Robinson, B.V.Sc., F.R.S.I., the director, gives credit to all members of the staff of the department for the very satisfactory manner in which they have carried out their duties.

W. W. H.

ABSTRACTS

The Effect of Dihydrotachysterol on Bovine Blood Calcium, Inorganic Phosphate and Sugar Levels*

Dihydrotachysterol is a stable, oil-soluble fraction obtained from irradiated ergosterol; its pharmacological action resembles that of parathyroid extract and it has been used in human medicine in conditions associated with hypoparathyroidism and other forms of impaired calcium metabolism. The authors have now studied its effect upon bovine blood mineral levels with a view to its use in hypocalcaemia associated particularly with parturition.

Three case histories, with analyses of blood samples, are described in which 5 c.c. of "A.T.-10" (Bayer), equivalent to 6·25 mg. of crystalline dihydrotachysterol, were injected intramuscularly; one cow received a second injection 24 hours after the first. The effects of oral administration (10 c.c. of "A.T.-10") were studied in a fourth cow.

Administration of the drug by either route produced consistent rises in the blood calcium levels, even in one case showing a very high initial level, the increases being maintained over an average period of four days. Oral administration produced a slower, but more protracted, response than intramuscular injection. There was a general increase in blood sugar levels, but an initial depression of phosphate levels which, however, subsequently returned to normal. Blood magnesium (estimated in two cases) showed no significant change.

Dihydrotachysterol may be of value in retarding the development of hypocalcaemia and in preventing the relapse of cases treated by conventional methods; the effect on blood sugar levels may also be of value to the cow in combating degrees of ketosis associated with normal pregnancy and parturition. Further information is necessary concerning the action of the drug on blood phosphate levels, particularly with regard to any undesirable sequelae in cases complicated by hypophosphataemia.

C. A. E. B.

* **The Effect of Dihydrotachysterol on Bovine Blood Calcium, Inorganic Phosphate and Sugar Levels.** Lewis, E. F., & Burrow, H. (1953). *Brit. vet. J.* **109.** 521–525.

* * * * *

Transfusion Therapy in Cattle and Horses*

The apparatus described with diagram in this article for the use of direct whole-blood transfusion in the ordinary farm cow or horse is so simple that it is worth describing in detail. It consists of a 2-litre flask (wide-necked Winchester quart bottle or similar glass container would do) with a two-holed cork. Through one hole a long glass tube is inserted to reach ½ inch from the bottom of the flask, and through the other, a short glass tube to the neck of the flask. About 18 inches of rubber tubing carrying size B.W.G.12, 1½-inch feeding needle is fitted on to the long glass tube, and 6 inches of similar tubing connects the negative side of an enema syringe to the short glass tube. 8 oz. of 2½ per cent. sodium citrate solution is put into

* **Transfusion Therapy in Cattle and Horses.** McGeady, P. A., & Bourke, P. J. (1953). *Irish vet. J.* **7.** 228–230.

return to its normal position, and on flexion and extension of the joint was seen to run normally on its condyles. The wound was sutured in layers using 2/0 catgut for the buried sutures and No. 3 Nylon for the skin.

Post-operative Treatment.—Penicillin, 600,000 units, was given immediately post operative and repeated daily for three days. The dog returned home the day after the operation. A further X-ray was taken on December 18th (Fig. 2). This showed good bony union, but the pins were left in until January 6th. Up to this point the leg had been carried and only tentative attempts at extension had been made. After the removal of the pins the dog started to use the leg with a rapid increase of confidence and an equally rapid return of muscle tone and development.

A final X-ray was taken on February 10th (Fig. 3). At this stage the dog was using the leg normally at all gaits.

the bottle which is then corked, agitated and the solution allowed to pass out through the long glass tube, rubber tube and needle. The needle is then introduced into the jugular vein of the donor animal and the syringe pumped slowly to fill, by negative pressure, a quart flask in four to five minutes. The needle is withdrawn from the vein and the syringe reversed. A fresh needle is attached and inserted into the vein of the recipient and the syringe pumps the blood by positive pressure, at a similar rate.

The authors state that an 8-cwt. beast can give up to 2 quarts of blood, and a recipient receive the same amount, though it is not usually necessary to use so much. On the ordinary farm a donor is generally available, and though it is not as a rule necessary to type the blood it is advisable to cross-match blood of valuable animals as blood groups do exist. Indications for use are given as surgical shock, severe haemorrhage, burns, anaesthetic collapse, redwater, etc., and the authors also mention that gelatin and gum acacia as a 6 per cent. saline solution, a 6 per cent. dextran in saline solution and plasmosan are good substitutes for whole blood, though the latter two are not cheap.

J. C. V. H.

* * * * *

Prevention of Calf Scours with Bovine Serum Solids*

A new therapeutic approach to the problem of calf scours has been made with the feeding of bovine serum solids, milk solids and vitamin K. Possible modes of action of these factors are described as follows: "The bovine serum solids are processed in such a manner as to retain a high percentage of the gamma globulin or immune factor. The vitamin K addition is to fortify the newborn animal against the haemorrhage that follows intestinal inflamation. It causes an early clotting at the possible portals of entry for bacterial invasion of the capillaries. The extrusion of the serum, rich in antibodies, from the clot is not only antitoxic but antibacterial. Vitamin K supports the liver in the production of prothrombin which is one of the factors in clot formation. Another reason for the early use of this food factor is that all mammalia are born vitamin K deficient. Since the enzyme system of the calf at this early stage is still quiescent—predigested milk solids become a source of food factors, including amino-acids, for immediate absorption and supply during the period of development of the digestive enzyme system."

The dosage levels giving the best results were 35 g. serum solids, 16 g. predigested milk solids and 50 mg. vitamin K, mixed in 1 quart of milk; this was divided into two equal portions fed one hour and six hours respectively after birth, to calves from widely separated herds. The results in 68 treated animals deprived of colostrum were good, only a few showing diarrhoea (not true " scours "); of 69 calves that received only colostrum many scoured, response to treatment was poor and four died within 48 hours.

Although no information is given concerning any direct or geographical relationships—often most important—between the calves and the source(s) of the serum solids, the immunological theory underlying the procedure is sound (see *Vet. Rec.* **64.** (35), Aug. 30th, 1952, p. 513). If the results described are confirmed the method may be of considerable value in the prevention of calf scours.

C. A. E. B.

* **The Prevention of Calf Scours with Bovine Serum Solids.** Christian, A. B., & Segard, C. P. (1953). *J. Amer. Vet. Med. Assoc.* **123.** 130–131.

THE NUTRITION SOCIETY

In the early days of the war when home food supplies both for man and beast were running short and substitutes had to be found a few nutritional enthusiasts got together and formed a Nutrition Society. The first exploratory meeting was held at the Royal Institution on July 23rd, 1941, and the first meeting of the Society took place at Cambridge on October 18th, 1941.

The object of the Society was to bring together those interested in nutrition from many different fields so that the problems of nutrition could be discussed from many different angles—theoretical and practical, farm animals and man, in health and in disease. The Council set up to run the affairs of the Society included representatives of medical and veterinary practitioners, of scientific laboratory workers both on the animal and human side, and of food manufacturers. This Council, through its Programmes Committee, decides from time to time what subjects shall be discussed at meetings of the Society and then asks speakers who are authorities on different aspects of the subject to give a short account of the state of knowledge, so that a bird's-eye view can be obtained of the whole problem. Divergent views are often expressed by these speakers and discussion ensues with an attempt to find out which is right or what further research needs to be done to settle the question.

Thanks to a guarantee by the Royal College of Physicians and Surgeons, through Lord Moran, the Society was enabled to print these proceedings and looking back this series does constitute an authoritative account of the state of recent knowledge concerning the nutritional problems of our day. To give an example of one of the earlier meetings on Trace Elements in Relation to Health held in London in October, 1942, papers were given on the significance of trace elements in relation to diseases of plants and animals by H. H. Green; the distribution of trace elements in soils and grasses by R. L. Mitchell; trace elements in relation to physiological function and enzymes by D. Kelin and T. Mann; enzoctic ataxia or swayback of lambs in England in relation to copper feeding of the ewes during pregnancy by T. Dalling; diseases of stock in Australia caused by deficiency of cobalt and of both cobalt and copper by C. J. Martin; Pining in Great Britain by W. Lyle Stewart; fluorine in human nutrition by M. M. Murray, D. C. Wilson and F. H. Kemp; industrial fluorosis of animals in England by F. Blakemore; " Teart " of Somerset: a molybdenosis of farm animals by W. S. Ferguson; and the absorption and excretion of trace elements by E. M. Widdowson and R. A. McCance.

A meeting to discuss the situation of derationing and the necessity for lowering the cost of production of animal products is to be held at Bangor on July 23rd to 24th next. The question of the factors which affect the conversion of feeding-stuffs will be among the subjects examined.

Since most of the meetings were held in London and a considerable number of members were resident in Scotland and so could not attend frequently, a Scottish Group was formed to hold meetings from time to time in Edinburgh, Glasgow and Aberdeen. Accounts of these meetings are also included in the proceedings.

Papers by Research Workers

Towards the end of the war in addition to these symposium meetings with invited speakers the Society began to hold a few meetings at which research workers could give a short preliminary account of their experiments and so obtain helpful criticism of their work before final publication. Summaries of these are also included in the proceedings. After the end of the war when the Society became reasonably well established, in 1947, they decided to start in addition to the Proceedings a British Journal of Nutrition for the publication of original papers.

An Editorial Board, representative of all branches of the subject, was appointed under the Chairmanship of Dr. S. K. Kon of the National Institute for Research in Dairying. This journal is now well established and has already published many papers of interest to veterinary surgeons, such, for instance, as those on the muscular dystrophy which develops in calves after feeding on cod liver oil, on the effect of antibiotics in the diet of the fattening pig, and one due in a forthcoming number on the effect of changes in the plane of nutrition on the fat content of the liver of ewes in relation to pregnancy toxaemia.

At present the Society consists of approximately 700 members and is under the Chairmanship of Dr. L. J. Harris, Dunn Nutritional Laboratory, Cambridge, with Dr. G. H. Bourne, London Hospital Medical School, as Secretary and Dr. K. J. Carpenter, Rowett Research Institute, Aberdeen, as Secretary of the Scottish Group. The meetings serve the useful purpose not only of discussing nutritional problems of topical interest but of forming a common ground for discussion between medical, veterinary, food manufacturing and scientific men interested in nutrition.

J. H.

NOTES AND NEWS

Diary of Events

May 1st.—Annual General Meeting of the Association of State Veterinary Officers in the Auditorium of the Wellcome Research Institute, 183-193, Euston Road, London, N.W.1, 2 p.m.

May 5th.—Meeting of the Supplementary Veterinary Register Division, B.V.A., at 7, Mansfield Street, Portland Place, London, W.1, 2 p.m.

May 5th.—Symposium on the Golgi Apparatus, by the Royal Microscopical Society, at Tavistock House South, (Entrance "D"), Tavistock Square, W.C.1, at 11 a.m.

May 6th.—A symposium on "The Design of Animal Houses" at the Royal Society of Medicine, 1, Wimpole Street, London, W.1, 10.45 a.m.

May 6th.—Meeting of the East Midlands Division, B.V.A., at the School of Agriculture, Sutton Bonington, 2.15 p.m.

May 6th.—Annual General Meeting of Central Veterinary Society at Royal Veterinary College, Camden Town, N.W.1, at 5.30 p.m.

May 7th.—Annual General Meeting of the Sussex Division, B.V.A., at the Old Ship Hotel, Brighton, 2.30 p.m.

May 7th.—Annual General Meeting of the Welsh Branch at Bear Hotel, Newtown, at 2 p.m.

May 12th.—Meeting of the R.A.V.C. Division, B.V.A., at the Canine Research Station, Newmarket, 11 a.m.

May 12th.—Annual General Meeting of the National Veterinary Benevolent and Mutual Defence Society at the Midland Hotel, Manchester, 2.30 p.m.

May 13th.—Annual General Meeting of the Essex Division, B.V.A., at the Essex Institute of Agriculture, Writtle, 7.30 p.m.

May 19th.—Meeting of the Royal Society of Medicine, Section of Comparative Medicine, at the Society's House, 1, Wimpole Street, W.1, at 5 p.m.

June 1st.—One hundred and eleventh Annual General Meeting of the Royal College of Veterinary Surgeons at 10, Red Lion Square, London, W.C.1, at 12 noon.

June 1st.—Annual General Meeting of Victoria Veterinary Benevolent Fund at Royal College of Veterinary Surgeons, 10, Red Lion Square, W.C.1, to follow the above meeting.

Sept. 19th—25th.—72nd Annual General Meeting and Congress of the British Veterinary Association at Torquay.

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PERSONAL

Births.—Dewar.—On April 22nd, 1954, at 73, Bridport Road, Dorchester, Dorset, to Joan, wife of H. D. Dewar, M.R.C.V.S., a brother for Neil.

Fraser.—On April 21st, 1954, at Benllech, Anglesey, to Nansi, wife of J. M. Fraser, M.R.C.V.S., a daughter.

Shorter.—On April 10th, 1954, to Ann, wife of David Richard Shorter, M.R.C.V.S., at Reading, Berks, a second son.

Smith.—On April 11th, 1954, at Redruth Hospital to Alice (*née* Moller Jensen) wife of Philip Smith, M.R.C.V.S.—a son.

Watt.—On April 17th, 1954, at 71, Prince's Street, Nuneaton, to Betty (*née* Ray) wife of David J. Watt, B.Sc., M.R.C.V.S., a son—John Michael.

R.C.V.S. Examinations

Friday, May 7th.—Pharmacology, etc., Examination (Revised Syllabus) Written Examination.

Monday, May 10th.—Pharmacology, etc., Examination (Revised Syllabus) Oral and Practicals (London and Dublin).

Tuesday, May 11th.—Animal Management Examination commences at Edinburgh.

Thursday, May 13th.—Entries for D.V.S.M. Examination due.

Thursday, June 10th.—D.V.S.M. Written Examinations commence at Edinburgh.

Monday, June 14th.—D.V.S.M. Orals and Practicals commence.

Thursday, June 24th.—M.R.C.V.S. Written Examinations.

Friday, June 25th.—Ditto.

Monday, June 28th.—M.R.C.V.S. Practical and Orals commence (Panels "A" and "B").

* * * * *

EDITOR OF "THE VETERINARY RECORD"

At the meeting of the Council held in Glasgow on Wednesday, April 14th, Mr. Charles Mitchell, hitherto the Association's Press Officer, was appointed Editor of "The Veterinary Record" by unanimous vote. He succeeds the late Mr. William Brown, who died on January 1st, after 33 years' service. In accordance with the proposal made by the Editorial Committee, and endorsed by the Finance and General Purposes Committee, the appointment was widely advertised and attracted approximately 50 replies.

The new Editor was educated at the County Grammar School, Southall, and at King's College, London. After a three-year course of study he was awarded the University Diploma in Journalism with distinctions in every subject. He then spent two years on local and provincial newspapers learning the technique of journalism, after which he joined the staff of the *Daily News*, later the *News Chronicle*. In 1937 Mr. Mitchell decided to set up in business on his own, and founded Mitchell Davies, Ltd., a firm of editorial and public relations consultants. The Company specialised in work for public organisations and voluntary societies. The articles, paragraphs, etc., which were prepared for these clients appeared in almost every newspaper and magazine in the British Isles, and in a number of newspapers abroad. In 1946 Mitchell was elected a Director of the Overseas and General Press, Ltd., of Fleet Street, and in that capacity edited or wrote some hundreds of feature articles which were published in Britain and throughout the Empire.

He published his first novel in September, 1952, and this was followed by a second in January, 1954.

Mitchell Davies, Ltd., were appointed Press Officers of the B.V.A. in July, 1952, and Mr. Mitchell undertook the work personally. He thereby gained a useful insight into the work and traditions of the Association, which should serve him well in his new post. On Mr. Brown's death he offered to assist in the production of *The Veterinary Record* and has done so on a part-time basis until now. In order to give his full attention to the journal he will be resigning the Directorships referred to above.

He takes up his appointment as Editor on June 1st.

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R.C.V.S. LIBRARY

We are asked to draw the attention of readers to a change in the telephone number of the R.C.V.S. Library. It is now Chancery 5822. The telephone number of the Royal College itself remains as before.

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MILK ADVISORY COMMITTEE

A Milk and Milk Products Technical and Advisory Committee has been set up by the Ministers of Agriculture and Food and the Secretary of State for Scotland.

Its terms of reference are:—

"To keep under review the technical problems arising at all stages of the handling, processing and distribution of milk and the manufacture of milk products; to inform the Ministers of the problems requiring research and of desirable technical developments; and to advise on the best means of encouraging the adoption of such developments in the dairy industry."

The committee will recommend the Ministers to arrange for such research as seems required by the Agricultural Research

Council, the Medical Research Council, the Department of Scientific and Industrial Research or other appropriate scientific bodies, and to seek the collaboration of commerical or other interests.

The chairman of the committee is Professor H. D. Kay, Director of the National Institute for Research in Dairying.

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VETERINARY CHESS CHAMPION

We have just learned that Dr. U. Richardson, of Maritzburg a veterinary surgeon, won the Maritzburg Chess Championship after eight weeks of closely contested play. Dr. Richardson, who is a veteran player, was one of the favourites for the Natal Championship which was contested during Easter. The results have not yet been declared.

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MINISTRY OF AGRICULTURE APPOINTMENTS

The Minister of Agriculture and Fisheries, with the approval of the Prime Minister, has made the following appointments with effect from May 1st: Mr. A. R. Manktelow, C.B., to be a Deputy Secretary of the Ministry in succession to Sir Reginald Franklin, whose retirement on April 30th has already been announced. Mr. C. H. M. Wilcox, Under Secretary, to be Principal Finance Officer in succession to Mr. Manktelow.

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PROFITS FROM FARMING

A very interesting and informative bulletin has been published by the West of Scotland Agricultural College entitled "The College Farm, Auchincruive, A Four Year Review, 1949-50 to 1952-53." It is written jointly by Professor John Kirkwood, O.B.E., lately Principal of the college, James A. Gilchrist, Advisory Economist and James M. Thomson, Farm Manager. The bulletin presents in summary form a review of the management methods and profits for the four years and contains much that is of great interest to agriculturists and veterinarians.

The dairy herd which was founded in 1911 is pedigreed and consists of 60 Ayrshire cows and 20 British Friesians. Between 1945 and 1953 the average herd yield has risen from 705 to 1,085 gallons and during the last five years the average lactation yield has been over 1,000 gallons. Details of feeding, housing, byre routine and calf rearing are fully described. Vaccination of calves with Strain 19 vaccine has proved effective in controlling abortion while the milking cows are examined for mastitis at three-monthly intervals. There has not been a case of summer mastitis in the last seven years during which time the udders and teats of all dry cows and in-calf heifers have been tarred with Stockholm tar at weekly intervals in the grazing season. The mortality in the herd in the past seven years has been very low, the total deaths consisting of three cows, nine bull calves, five heifer calves and five other young stock. Fourteen Ayrshire and seven British Friesian bullocks were raised for beef and graded in 1952-53. Twelve of these were graded straight off the grass and nine were finished indoors. The carcases were all of prime quality and free from excess fat.

The pig herd consists of about 30 breeding sows the progeny of which are reared and sold as bacon pigs. Pure bred Large Whites are kept, but four Wessex Saddleback gilts were introduced in 1951. Once again, details of the housing, feeding and management are fully described. The breeding programme is arranged so that four or five sows are farrowing monthly while the sows farrow every 27 weeks and produce 15 to 16 weaned pigs annually. In the four years under review there were 211 farrowings in which two litters were farrowed dead. The piglets born per live farrowing averaged 10·69 and the piglets weaned per farrowing numbered 8·06. Sows are retained for breeding only so long as they continue to produce good litters and rear them satisfactorily. This is usually for eight or nine litters, but as soon as production falls the sows are culled. The breeding stock are Tuberculin tested annually and there have been no reactors. Annual inoculation with Crystal Violet vaccine is practised and the use of Swine Erysipelas serum has prevented serious losses from this disease.

A small low ground flock of 60 to 80 ewes either half-bred (Border Leicester × Cheviot) or Crosses (Border Leicester × Blackface) is kept and tupped by a Suffolk ram for rearing fat lambs.

The net profit for the whole farm has been £17,716 for the four years. The combined dairy herd profit, *i.e.*, Milk Production, Heifer Rearing and Bullock Rearing was £6,200, the profit from pigs £12,394 and sheep £983. The net losses included £2,417 for land reclamation which was written off. It is interesting that the profits from pigs were almost double those from dairying and that a small sheep flock gave an average profit of £4 14s. per week for four years.

Rarely has so much valuable data been condensed in such readable form. There is a wealth of information on husbandry and cropping and the information cannot fail to be of interest to all who are interested in agriculture.

Finally, the main purpose of the Auchincruive farm is educational, and also to provide facilities for demonstrations and experiments of a practical nature. It follows that the farm is not run with profit making as the chief aim; but nevertheless, a college farm will better serve its educational and demonstrational functions if it is run on a sound financial basis.

Anyone interested may purchase the bulletin, which is No. 150, for 2s. from the West of Scotland Agricultural College, 6, Blythswood Square, Glasgow, C.2.

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PROFESSIONAL TREATMENT FOR ANIMALS

The following letter appeared in the *Western Gazette* of April 16th over the signature of Mr. Hugh Ricketts, Branch Hon. Secretary of the R.S.P.C.A.:—

I am writing to express concern at the number of animal owners who appear to take their animals, especially cats, to anyone other than a qualified veterinary surgeon when needing a minor operation. This practice is not in the least necessary when there are so many veterinary surgeons almost everywhere in Dorset, and the fees for this operation are so small. Owners of such animals would not, I am sure, dream of going to anyone themselves when needing operative treatment other than to a doctor, and I consider it right and proper that animals—who can feel pain and discomfort as much as human beings can—should be taken to and receive proper veterinary medical attention when it is required. The R.S.P.C.A. in North Dorset provide financial help to all those animal owners who are unable to pay veterinary fees by first contacting Inspector Hancock, of Blandford, who will be pleased to help anyone needing this service.

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UFAW CONGRESS DELEGATES VISIT THE ZOOLOGICAL SOCIETY

On Wednesday, April 7th, 1954, members of the Universities Federation for Animal Welfare attending the Easter Congress visited the Zoological Society of London where they were greeted by Mr. Oliver G. Jones, Curator of Mammals and Veterinary Officer. Mr. Jones addressed the party for a short time in the Meeting Room, indicating some of the difficulties associated with the maintenance of wild animals in captivity. Mr. Jones emphasised that foremost in the minds of the Zoological Society was the need for maintaining the welfare of zoo specimens at a very high level. Not only must diet, hygiene, housing, acclimatisation and travel be most carefully supervised, but an efficient veterinary service must be instituted in such a collection. The speaker illustrated how these ambitions and duties were achieved. Afterwards the party divided into two groups who were conducted through the Gardens with stops in the Monkey House, Mappin Terraces, Aquarium and Lion House. Amongst those present were the Chairman of UFAW, Major C. W. Hume, and the Secretary, Miss Williams. At the conclusion of the morning a vote of thanks was proposed to the Zoological Society for the facilities placed at their disposal.

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ERRATUM

In the article entitled "The Normal Intestinal Flora of the Pig I—Bacteriological Methods for Quantitative Studies" by C. A. E. Briggs, Joan M. Willingdale, R. Braude and K. G. Mitchell, which appeared in last week's issue, there was a small printers' error in Table I. In the "RCM" line of the last column the figures $1·28 \times 10^6$ should have read $1·28 \times 10^9$.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Ayrshire.—Dalvennan Farm, Maybole (Apr. 20).
Cumb.—Fairladies Farm, St. Bees (Apr. 20); Yottenfews Farm, Calderbridge (Apr. 23); Low House, Tracentree, Wigton (Apr. 24).
Ches.—Elm Farm, Chorton Heath, Saighton (Apr. 24).
Devon.—Madiera Field, West Park, Horrabridge (Apr. 24).
Dorset.—Ryalls Farm, Stalbridge, Sturminster Newton (Apr. 20).
Lancs.—Sumners Farm, Fulwood Row, Fulwood, Preston (Apr. 24).
Somerset.—Lower Thorne, Exford, Minehead (Apr. 24).
Suffolk (E.).—Home Farm, Wetherden, Stowmarket (Apr. 22).

FOWL PEST:

Beds.—Ashbury Farm, Langford, Biggleswade (Apr. 20).
Essex.—Cemetery Fields, Bocking, Braintree (Apr. 24).
Lancs.—Unsworth House, St. Michaels, Preston (Apr. 20); Brooklands, St. Michaels-on-Wyre, Preston; Lower Hill Poultry Farm, Chorley Road, Withnell, Chorley (Apr. 21); Hazeldene, Station Road, Little Hoole, Preston (Apr. 22).
Leics.—Hollies Farm, Little Dably, Melton Mowbray (Apr. 22).

SWINE FEVER:

Berks.—Pinkneys Green Farm, Maidenhead (Apr. 26).
Bucks.—Hurst End Farm, North Crawley, Newport Pagnell (Apr. 22).
Cambs.—Newhouse Farm, Great Abington (Apr. 21); Worts Farm, Landbeach (Apr. 26).
Ches.—Walnut Tree Farm, Alvanley, Warrington; Mereside Farm, Mere, Knutsford (Apr. 21); Manor Farm, Barnston Road, Barnston, Wirral; Marsh Farm, Frodsham, Warrington; Green Farm, Thornton-le-Moors, Chester; Church House, Marton, Chelford (Apr. 23).
Derbys.—Stuffing Wood Hall Farm, Pleasley Vale, Mansfield (Apr. 24).
Essex.—"Queens Orchard," Great Waltham, Chelmsford; 6, Crow Lane, Romford (Apr. 22); Wellington Hall, Rainham (Apr. 24).
Glam.—Bwll-y-Cwm Piggeries, Blaengwnlais, Tongwynlais (Apr. 23).
Lancs.—Oakfield House Farm, Liverpool Road, Lydiate, Maghull (Apr. 22); Crane Hall Farm, Out Rawcliffe, Preston; Cherry Tree Farm, Sandy Lane, Lydiate, Maghull, Liverpool (Apr. 26).
Leics.—"The Cedars," Skeffington, Leicester (Apr. 24).
Lincs. (*Kesteven*).—Chaplin Arms Farm, Martin, Lincoln (Apr. 22).
Middx.—Lankaster Gardens, E. Finchley, London, N.2 (Apr. 26).
Monmouth.—Ty-Michall Farm, Cmavon, Blaenavon (Apr. 23).
Norfolk.—"Rosedene," Shorthorn Road, Stratton Strawless, Norwich (Apr. 23).
Notts.—Hill Top Farm, Flintham, Newark (Apr. 20).
Salop.—Bank Farm, Wrockwardine, Wellington (Apr. 22).
Staffs.—Onneley Hall, Onneley, Nr. Madeley, Crewe (Apr. 23).
Suffolk (E.).—Hall Farm, Hasketon, Woodbridge (Apr. 21); Ash Farm Cottages, All Saints Green, Halesworth (Apr. 23); The Grange, Redgrave, Diss (Apr. 26).
Surrey.—"Di Giorgio," South Lane, Ash, Aldershot (Apr. 23); Headley Park Farm, Headley, Leatherhead (Apr. 26).
Sussex (W.).—Old House Farm, Cocking, Midhurst (Apr. 26).
Wilts.—Old Dilton Farm, Westerby (Apr. 26).
Worcs.—Furzens Farm, Wyre, Pershore (Apr. 21).
Yorks (E.R.).—"Rosedene," Endike Lane, Cottingham (Apr. 21); Glebe Farm, Hilston, Withersea (Apr. 24); Kettlethorpe Farm, South Cave, Brough (Apr. 26).
Yorks (W.R.).—The Homestead, Hambleton, Selby (Apr. 21); Keldholme, Linton, Wetherby (Apr. 23); Newstead Farm, Lead, Tadcaster; Beverley House Farm, Ferrybridge, Knottingley (Apr. 26).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE MARKETING AND TRANSPORT OF ANIMALS

Sir,—"Some Observations on the Marketing and Transport of Animals" by Mr. J. O. L. King is a type of article too infrequently seen in the veterinary Press. His remarks are controversial and, no doubt, Mr. King will expect some criticisms, which he should take as the best compliment that can be paid to any article writer.

His remarks about cattle markets and the beasts bought there have been a feature of our profession from the day we started college. This attitude is a little out of tune with the facts which Mr. King is now asked to consider.

The farmer takes his beast to the market because that is where the buyers are and that is where he will get a fair price. If this statement is incorrect, there would be no livestock markets in Britain to-day. Farmers are shrewd business men and would not support such an institution if they were not satisfied with it. On the contrary, livestock owners have patronised markets from ancient times and to-day more so than ever. To a puzzled veterinary surgeon the recently purchased market beast is often branded as responsible for, say, Johne's disease or a bout of infertility in the herd. This is a convenient diagnosis and possibly correct, but what if such a beast is bought privately? The veterinary surgeon cannot talk in an automatic manner about the evils of markets; he would be cautious as litigation could be around the corner. If the bought animal is, for example, a brucella case, the result to the purchaser is the same whether the deal is private or through a market. Indeed it is true to say that in some instances the purchaser can buy with greater safety and confidence from a market than privately, in that many breed society sales set standards of health and comprehensive rules for post-sale disputes that would not apply to the private deal.

Mr. King's suggestion that "purchasers acquiring cattle privately can be guided by the disease history of the herd" is a little unrealistic. How can he get this information? It is doubtful whether the breeder will open his heart to a prospective client about his disease problems, neither will his veterinary surgeon, to whom such knowledge is confidential. Any man giving hearsay information of this kind at a sale (dispersal, private or collective) could again be walking the legal tight-rope.

Tuberculosis, mastitis, Johne's disease and trichomoniasis are quoted as diseases most likely to be bought by buyers of cattle. This must apply to cattle sold both privately and in the market. The last two diseases named are unlikely to affect other cattle in the market. An unsuspected case of open tuberculosis certainly could infect other sale cattle, although in the type of sale in which such an animal would be entered this factor might not be as serious as it sounds. If such an animal finds its way into an attested sale and causes trouble (as it surely will), we are so occupied in criticising this situation that we may not realise that eyes are turned awkwardly on the veterinary profession.

The sale that contains cattle with an "if" about them is unlikely to be patronised by stockmen other than those whose herds already consist of such cattle. The gentlemen hanging over the top rail with their hats over their eyes are the buyers and the sellers.

The idea of unsound cattle being in a market may horrify some members of our profession, but if we are to judge the situation fairly, we must also realise that some of these cattle may be there as a result of our own advice.

Everyone will agree with Mr. King's remarks about the overstocking of udders for sale purposes, but few vendors to-day are at fault in this respect. Purchasers, however, cannot be expected to buy cattle on milk records alone, as Mr. King suggests, and, in any case, none would be available for the freshly calved heifer. A prospective buyer likes to see how the full udder is carried, to note the placing of the teats, whether milk is drawn easily or not, and, after the sale, how the beast milks out. Whether we like it or not, an udder must be handled to be judged, and risk of spreading disease must be accepted.

The chances of infection being spread by this means are surely small. The usual practice of not milking out on the morning of the sale shows off an udder satisfactorily and is in no way overstocking.

A market contains pleasant personalities among farmers, auctioneers, breed society officials, dealers and others, all with a job to do; a place where our own profession is also called to perform. It is time that we realised that a busy market is an indication of a healthy and booming agriculture and is not the pit of sin and disease as believed in some quarters.

All will support Mr. King's anxiety for the welfare of all animals exhibited at markets and during transit. It is doubtful, however, whether the electric goader is a humane instrument. The movement of animals to and from pens at a store sale presents a problem and must be done quickly and efficiently if chaos is to be avoided. Compared with the drover's stick, an electric goader is like the Pharisees' sepulchre—nice on the outside, and shocking on the inside—but it seems to keep people happy.

The transport of livestock on long sea journeys, as Mr. King points out, entails the placing of the animals with their long axis across the ship. He says that they "must be tied so as to stand facing the sides of the ship." This position if adopted literally may be untenable in heavy weather for those animals nearest the hull, unless it is realised that they should face inwards and not outwards. The inner rows may face outwards conveniently as the pendulum action in this position is not so marked.

The ears of a mule may be expected to collect more sound waves than those of a horse, but the noise of aero engines (piston!) does not appear to worry them. They behave with the phlegm and assurance of seasoned campaigners who, in this case, joined the army and saw the world.

Pigs travel well by plane, provided accommodation is constructed with an eye to their weight and strength. Pig-minders on the early trips of the recent European pig run had anxious moments when the walls of the pens between neighbouring boars were broken down. Apart from fighting scars, little damage was done. An exception was the pig that died while fighting as it was crossing a corner of the Alps. Death was probably due to cardiac failure as a result of its excess demands on oxygen which, at that height (11,500 feet), may not have been sufficient to meet requirements.

The marketing and transport of livestock will continue and increase. It is good that Mr. King has written on these important subjects and it is to be hoped that he will perhaps receive these remarks with the good wishes that go with them.—Yours faithfully, A. K. Kirkwood, 14 & 16, Queen's Road, Reading. *April 23rd*, 1954.

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ROUGHENING OF COWSHED FLOORS

Sir,—Some cowshed floors are being hardened and slightly roughened by applying carborundum powder to the surface before the concrete has set in the proportion of 2 to 3 lb. of grit to 1 square yard of floor, and it has been reported that such a surface is liable to injure the teats of cows lying on it. I should be grateful if any member of the profession who has encountered such cases would send me details.—Yours faithfully, J. O. L. King, University of Liverpool, Field Station, Neston, Wirral. *April 26th*, 1954.

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"APPOINTMENTS IN NEW ZEALAND"

Sir,—In his letter, implemented by the fact that he relinquished his appointment after two years' service, Mr. Toovey expresses his dissatisfaction with Veterinary Club practice in New Zealand. Criticism of the method of control is implied, however, without reference to three considerations which warrant emphasis:—

(*a*) In the case of salaried positions with the security offered, it is inevitable that some form of employing authority must exist. The degree of "control," if the term has to be used, so often depends on human relationship. The personality of individuals can make the situation mutually attractive or correspondingly irksome.

(*b*) The majority of members of the New Zealand Veterinary Association are veterinary surgeons in Club practice. The system and the form of contract as between the Veterinary Club and veterinary surgeons has been approved by the Association.

(*c*) The Veterinary Club system in New Zealand is firmly established. The system is expanding, as evidenced by the fact that the empowering Act was only passed in 1946, and at March 31st, 1953, there were 124 Club Veterinarians. Since that date there has been further recruitment, and the present advertisement is to obtain applicants to meet expansion requirements.

Mr. Toovey's reference to income tax and social and national security tax is correct, but he should have made it clear that both together are lower than the corresponding forms of taxation in this country. Exact comparisons of the cost of living are not easy. By and large, however, the position in New Zealand does not materially differ from that in England.

The main roads in New Zealand compare favourably with their counterparts in this country; other roads fall below the corresponding standard, but to apply the term "atrocious" to the roading system in the main is, of course, an exaggeration.

There is no disadvantage in running one's own car at scale mileage rates. In any case, if this arrangement is unacceptable, the Clubs will provide and maintain a car for official work.—Yours faithfully, C. V. Dayus, *Agricultural Adviser*, New Zealand Government Offices, 415, Strand, London, W.C.2. *April 21st*, 1954.

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"PENICILLIN LEVELS IN COW'S MILK AFTER INTRAMAMMARY INFECTION"

Sir,—In commenting on our recent paper (Uvarov & Muggleton, 1954) about procaine penicillin cerate, Hughes (Corresp. column, *Vet. Rec.*, April 17th) has pointed out that we quoted the satisfactory response that he found to procaine penicillin but ignored the equally satisfactory response to the calcium salt. Our paper was only concerned with the use of procaine penicillin as a long-acting repository preparation, so that we considered irrelevant any reference to soluble salts of penicillin.

We are indeed well aware of the "pros and cons" of an interrupted treatment with penicillin; obviously we cannot discuss this question here. We admit that "interrupted" treatment given regularly and at carefully controlled intervals is satisfactory, but it is evident that lack of adequate control and demands of time often render such frequent treatment less effective. In that event a long-acting preparation, needing few and widely spaced doses, would appear to offer an advantage.

We would, however, agree with Mr. Hughes's last paragraph, in that prolonged persistence in the udder may not always be required. Obviously some types of infection will do better with an "interrupted" schedule, and the choice must remain with the veterinary surgeon to select the treatment most appropriate to his case.—Yours faithfully, Olga Uvarov and P. W. Muggleton, Glaxo Laboratories, Ltd., Greenford, Middlesex. *April 20th*, 1954.

Reference

Uvarov, O., & Muggleton, P. W. (1954). *Vet. Rec.* **66.** 200.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 31st March, 1954	11	1	43	—	53
Corresponding period in—1953	44	1	12	—	177
1952	22	27	10	—	69
1951	20	—	11	—	34
1st January to 31st March, 1954 ...	71	11	411	—	335
Corresponding period in—1953	294	22	183	—	563
1952	119	56	65	1	275
1951	146	17	439	4	210